Vocabulary insertion and locality: Verb suppletion in Northern Paiute*

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1. Introduction

In Distributed Morphology, the insertion of vocabulary entries can be conditioned by the surrounding context. This contextual allomorphy is not unconstrained. Besides the restrictions imposed inherently by the cyclic application of vocabulary insertion, there are two other locality constraints that are generally thought to be relevant.

First, there may be *a restriction on the domain of contextual allomorphy*. Vocabulary insertion could only be conditioned, say, by an element contained within the same maximal projection or complex syntactic head. Second, even within this domain, vocabulary insertion may be constrained by *an adjacency requirement*. This would compel the trigger of allomorphy to be located 'next to' its target in some sense.

Northern Paiute (Uto-Aztecan: Western United States) reveals something about both these locality conditions. As I argue below, verb suppletion in the language requires the domain of contextual allomorphy to extend beyond both a maximal projection (Bobaljik 2012) and syntactic sisterhood (Bobaljik & Harley 2013). The trigger of this type of allomorphy can be an external argument or the applied object in an applicative.

But the outer limits of this domain remain out of sight, at least in Northern Paiute. Verb suppletion exhibits an intervention effect: the trigger must be the closest possible trigger. I propose this arises from an adjacency requirement that is *relativized* to syntactic category.

(1) *Relativized Adjacency*
For any vocabulary entry of the form: *abc* $\leftrightarrow$ X[$F_1 : \alpha$] / Y[$F_2 : \beta$] ___, the exponent *abc* can be inserted at a node with syntactic category X and feature [$F_1 : \alpha$], if there is no closer element of syntactic category Y than one with feature [$F_2 : \beta$].

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In the spirit of Arregi & Nevins (2012), this adjacency requirement assigns a privileged role to syntactic category during vocabulary insertion. Not only does it successfully account for verb suppletion in Northern Paiute, I believe it may help with several recalcitrant cases of non-local contextual allomorphy that have been reported in other languages.

2. Verb suppletion in Northern Paiute

Northern Paiute has a class of verbs that supplete for number, just as in other Uto-Aztecan languages (Hale et al. 1991, Bobaljik & Harley 2013).[1,2]

(2) a. Su=nana **wɨ'i**-hu.
NOM=man **fall.SG**-PFV
'The man fell.' (elicitation, EM, BP52-1, 16:34)

b. Iwa-'yu naana **wiide**-hu.
many-NOM men **fall.PL**-PFV
'Many men fell.' (elicitation, EM, BP52-1, 18:27)

(3) a. Nɨɨ ka=tɨhɨdda **patsa**-hu.
1SG.NOM ACC=deer **kill.SG**-PFV
'I killed the deer.' (elicitation, MS, BP52-3, 9:00)

b. Nɨɨ ka=iwa-ggu tɨhɨdda **koi**-hu.
1SG.NOM ACC=many-ACC deer **kill.PL**-PFV
'I killed the many deer.' (elicitation, EM, BP52-3, 10:05)

Intransitive verbs supplete for the number of the subject (2a–b), and transitive verbs for the number of the object (3a–b). Subjects of transitive verbs never trigger suppletion (4).

(4) *__Iwa-'yu naana__ sɨmɨ-ggu tɨhɨdda **koi**-hu.
many-NOM men one-ACC deer **kill.PL**-PFV
Intended: 'Many men killed one deer.' (elicitation, EM, BP52-7, 40:32)

I take verb suppletion in Northern Paiute to result from stem allomorphy, rather than from agreement. As Durie (1986) shows, verb suppletion patterns differently in several respects across languages and is generally independent of a language's agreement system.

Bobaljik & Harley (2013) take parallel facts in Hiaki to support a stringent limit on the domain of contextual allomorphy, which they adapt from Bobaljik (2012). He proposes

[1] In Northern Paiute, I have found at least 23 verbs that supplete. Some just have singular and plural forms, while others exhibit a three-way contrast between singular, dual, and plural.

[2] The data in this paper come primarily from my own fieldwork on the variety of Northern Paiute spoken at Mono Lake in eastern California and immediately to the north in Bridgeport and Coleville, California and Sweetwater, Nevada. There are several other closely related dialects spoken across, and immediately adjacent to, the Great Basin. These dialects are all mutually intelligible; the variation amongst them is primarily phonological and lexical (see Babel, Houser, & Toosarvandani 2012 and Babel, Garrett, Houser, & Toosarvandani 2013 for details). I have also drawn on data from the Burns, Oregon variety (Thornes 2003).

I use the following abbreviations in this paper: ACC = accusative, APPL = applicative, DL = dual, EXCL = exclusive, IPFV = imperfective, IRR = irrealis, LOC = locatival postposition, NOM = nominative, PASS = passive, PFV = perfective, PL = plural, SG = singular, TNS = 'general tense' (see Toosarvandani, to appear).

that vocabulary insertion can only be conditioned by an element within the same maximal projection, in order to account for crosslinguistic patterns of suppletion in comparatives. Bobaljik & Harley strengthen this: the trigger and target in contextual allomorphy cannot be separated by any phrasal boundary, including an intermediate one.

(5) *Sisterhood Domain for Contextual Allomorphy (Bobaljik & Harley 2013:10)*
β may condition the insertion of α in (a), but not (b):
a. β … $[_{X^0}$ … α
b. *β … $[_{X^n}$ … α where $n > 0$

In other words, contextual allomorphy is restricted to syntactic sisters or a complex head. This derives the contrast in (3b) and (4), since only the direct object is sister to the verb.

3. Two arguments against the sisterhood domain

There are two arguments that the domain of contextual allomorphy extends beyond sisterhood. In Northern Paiute, unergative subjects and applied objects of applicatives can condition suppletion, even though they both originate in a verbal functional projection.

3.1 Unergative subjects

The suppletive verb *wɨ'i* ∼ *wiide* 'fall' in (3a–b) is likely unaccusative, and so it does not cause any problems for the sisterhood domain. The subject originates as the complement of verb, conditioning its insertion before it raises. But unergative verbs would cause a problem, assuming their subjects originate in Spec-vP (Kratzer 1996).

In Hiaki, Bobaljik & Harley argue that all intransitive suppletive verbs are unaccusative, since they do not occur with the applicative (which they assume is incompatible with unaccusatives). But in Northern Paiute, there are suppletive verbs that are plausibly unergative.

(6) a. Su=nana **yadu'a**.
NOM=man **talk.IPFV.SG**
'The man is talking.' (elicitation, EM, BP56-2, 1:02)
b. Iwa-'yu naana **abbika**.
many-NOM men **talk.IPFV.PL**
'Many men are talking.' (elicitation, EM, BP56-2-s, 1)

(7) a. Su=mogo'ni **isaya'e**.
NOM=woman **tell.lie.SG.IPFV**
'The woman is telling a lie.'
b. Iwa-'yu momoko'ni **isago'i**.
many-NOM women **tell.lie.PL.IPFV**
'Many women are telling lies.' (elicitation, MS, BP61-1, 1:01:53)

Neither verb in (6–7) is a motion or posture predicate, semantic categories often associated with unaccusativity. Moreover, the passive can be used to show that *yadu'a* ∼ *abbika* 'talk' and *isaya'e* ∼ *isagoi* 'tell a lie' are unergative verbs.

In Northern Paiute, the passive applies not just to transitive verbs (8a–b), but also to unergatives (9a–b). It is ruled out, however, with unaccusatives (10a–b).

(8) a. Su=nana ka=tɨhɨdda patsa-hu.
NOM=man ACC=deer kill.SG-PFV
'The man killed the deer.' (elicitation, EM, BP57-2, 28:12)
b. Su=tɨhɨdda **na-**batsa-hu.
NOM=deer **PASS-**kill.SG-PFV
'The deer was killed.' (elicitation, EM, BP57-2, 29:03)

(9) a. Nɨɨ (*ka=mogo'ni) yadua-hu.
1SG.NOM ACC=woman talk.SG-PFV
'I talked (to the woman).' (elicitation, EM, BP57-5, 36:31)
b. **Na-**yadu'a.
PASS-talk.SG.IPFV
'There is talking.' (elicitation, EM, BP57-6-s, 6)

(10) a. Su=nana **wɨ'i**-hu.
NOM=man **fall.SG**-PFV
'The man fell.' (elicitation, EM, BP52-1, 16:34)
b. ***Na-**wɨ'i.
PASS-fall.SG
Intended: 'There was falling.' (elicitation, EM, BP57-2, 56:32)

Since the passive can occur with the intransitive suppletive verb *yadua* ∼ *abbiga* 'talk' (9b), it must be unergative. Its subject originates in Spec-vP, and yet it conditions suppletion.

3.2 Applied objects

Another argument against sisterhood as the domain of contextual allomorphy comes from applicatives. In Northern Paiute, the applicative suffix adds an argument whose thematic role varies with the verb. Some receive a causative interpretation, e.g. *ne* 'burn' (11a–b); others have a benefactive interpretation, e.g. *nanisudɨhe* 'pray' (12).

(11) a. Nɨɨ ka=nobi ne**-ggɨ**-hu.
1SG.NOM ACC=house burn**-APPL**-PFV
'I burned the house.' (elicitation, EM, BP57-6-s, 13)
b. *Su=nobi ka=nana ne**-ggɨ**-hu.
NOM=house ACC=man burn**-APPL**-PFV
Intended: 'The house burned for/on the man.' (elicitation, EM, BP57-6, 49:30)

(12) Nɨɨ ka=mogo'ni nanisudɨhe**-ggɨ**-ti.
1SG.NOM ACC=woman pray**-APPL**-TNS
'I am praying for the woman.'
Impossible: 'I am making the woman pray.' (elicitation, EM, BP58-5, 3:00)
[EM: "You're doing the praying."]

When the applicative suffix has a benefactive interpretation, I assume the applied object is introduced in the specifier of Appl, a functional head located between VP and vP (Pylkkänen 2008:18). This is a high applicative compatible with unergatives, e.g. (12) and (15–14), as well as with stative predicates that do not describe a transfer of possession (13).

(13) N~~ii~~ ka=opo ka=mogo'ni **tse**-gg~~i~~-ti.
1SG.NOM ACC=basket ACC=woman **hold**-APPL-TNS
'I am holding the basket for the woman.' (elicitation, EM, BP57-5-s, 16)
[EM: "Yeah, you're holding the basket for the other woman."]

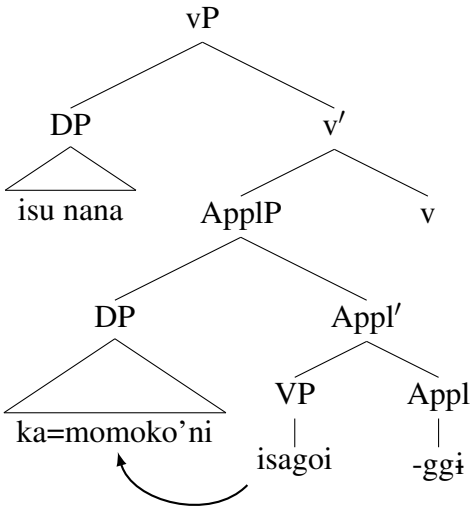
Interestingly, when the applicative suffix has a benefactive interpretation and occurs with a suppletive verb that is unergative, its form varies with the number of *the applied object, not the subject*. Compare (14) and (15) to (6) and (7), respectively.

(14) a. Su=nana **iwa-ggu momoko'ni abbiga**-gg~~i~~-ti.
NOM=man **many-ACC women talk.PL**-APPL-TNS
'This man is talking for many women.' (elicitation, MS, BP59-1, 19:33)
b. ***Iwa-'yu nanaana** ka=mogo'ni **abbiga**-gg~~i~~-ti.
many-NOM men ACC=woman **talk.PL**-APPL-TNS
Intended: 'Many men are talking for the woman.' (elicitation, MS, BP59-1, 18:24)

(15) a. Isu nana **ka=momoko'ni isagoi**-gg~~i~~-ti.
this.NOM man **ACC=women lie.PL**-APPL-TNS
'The man told a lie to the many women.' (elicitation, MS, BP61-1, 1:03:03)
b. ***Iwa-'yu nanaana** ka=mogo'ni **isagoi**-gg~~i~~-ti.
many-NOM men ACC=woman **lie.PL**-APPL-TNS
Intended: 'Many men told lies to the woman.' (elicitation, MS, BP61-1, 1:04:05)

If the domain of contextual allomorphy were restricted to the sisterhood relation, this should be impossible. The applied object is contained in a different projection altogether from the suppletive verb.

(16)



For both these reasons, it is hard to see how sisterhood can be maintained as the domain of contextual allomorphy.

3.3 How large is the domain of contextual allomorphy?

Unfortunately, Northern Paiute does not actually tell us how large the domain of contextual allomorphy is, for reasons that will become more clear later. It must extend beyond sisterhood, but there are many ways to do this that are compatible with the data above. I will discuss just one such hypothesis about the domain of contextual allomorphy here.[3]

Embick (2010) aims to derive the domain of contextual allomorphy from the interaction between the syntactic cycle and vocabulary insertion. Specifically, he proposes (p. 53) that each phase head triggers spell-out—and hence vocabulary insertion—of any phases inside its complement. This restricts the domain of contextual allomorphy to the phase that immediately contains the phase in which vocabulary insertion is applying.

(17) *Phase-Based Domain for Contextual Allomorphy (cf. Embick 2010:53)*
β may condition the insertion of α in (a) or (b), but not (c), where δ is a phase head (v, C, or D):
a. δ [… β … α
b. β … δ [… α
c. *β … δ [… δ [… α

The phase-based domain correctly allows for unergative subjects in Spec-vP to condition suppletion of the verb (7–6). Only when C is merged does the vP phase undergo spell-out, permitting vocabulary insertion of the verb to be conditioned by the external argument in Spec-vP. But it cannot be responsible for the pattern of suppletion with transitive verbs. Only the direct object conditions suppletion (4), even though both it and the subject are only separated by a single phase boundary. For the same reason, it does not derive that an applied object triggers suppletion over an intransitive subject (14–15).

The phase-based domain also cannot derive that only the original direct object conditions suppletion when the applicative applies to a transitive verb (18). Assuming that there are no additional cyclic nodes inside vP, the original direct object and applied object in (18) are contained within the same phase.

(18) a. Su=nana ka=mogo'ni **ka=iwa-ggu** **tɨhɨdda** **koi**-ggɨ-ti.
NOM=man ACC=woman **ACC=many-ACC** **deer** **kill.PL**-APPL-TNS
'The man killed the many deer for the woman.' (elicitation, EM, BP54-2, 1:07:54)
b. *Su=nana **ka=momoko'ni** ka=tɨhɨdda **koi**-ggɨ-ti.
NOM=man **ACC=women** ACC=deer **kill.PL**-APPL-TNS
'The man killed the deer for the women.' (elicitation, EM, BP54-2, 1:09:19)

[3] Another possibility: Moskal & Smith (to appear) propose to draw the outer limit of the domain of contextual allomorphy at the node immediately dominating the highest category-defining node above a suppletive root. If v is the highest category-defining node above the verb, then the external argument in Spec-vP would always be visible to condition its suppletion.

More generally, the patterns of verb suppletion in Northern Paiute cannot arise from a fixed limit on the domain of contextual allomorphy. Once this is big enough to include the external argument, it can no longer discriminate amongst multiple arguments of the verb.[4]

4. Relativized adjacency

Taking a step back, it seems that we may have been looking in the wrong place for an account of verb suppletion in Northern Paiute. The patterns from the data above are schematized below, with the trigger of suppletion in bold.

(19) a. $[_{vP}\ [_{VP}\ \mathbf{DP}\ V\ ]]$ = (2)
b. $[_{vP}\ \mathbf{DP}\ [_{VP}\ V\ ]]$ = (6–7)
c. $[_{vP}\ DP\ [_{VP}\ \mathbf{DP}\ V\ ]]$ = (3)
d. $[_{vP}\ DP\ [_{ApplP}\ \mathbf{DP}\ [_{VP}\ V\ ]]]$ = (14–15)
e. $[_{vP}\ DP\ [_{ApplP}\ DP\ [_{VP}\ \mathbf{DP}\ V\ ]]]$ = (18)

When there is just a subject, it conditions suppletion, regardless of whether the verb is unaccusative or unergative. But when there is a direct object or the applied object of an unergative verb, it conditions suppletion of the verb instead. Finally, when the applicative suffix applies to a transitive verb, it is the direct object that conditions suppletion. In other words, it is always *the closest DP to the suppletive verb* that conditions suppletion.

To capture this generalization, I propose that the suppletive verb must be *adjacent* in a certain way to its trigger. Such an adjacency requirement is generally assumed to constrain contextual allomorphy (Siegel 1978, Allen 1978, Embick 2010:49f., 2012:13, Arregi & Nevins 2012:114). It is often encoded implicitly in the contextual restriction of a vocabulary entry, though it need not be, as Moskal & Smith (to appear, p. 5) discuss.

(20) *Adjacency*
For any vocabulary entry of the form: *abc* $\leftrightarrow$ X[$F_1 : \alpha$] / Y[$F_2 : \beta$] ___, the exponent *abc* can be inserted in a node with syntactic category X and feature [$F_1 : \alpha$], if there is no closer element than one of syntactic category Y with feature [$F_2 : \beta$].

Sometimes adjacency is taken to imply *linear* adjacency, but nothing I say here requires it to be defined with respect to hierarchical structure (Siegel, Allen) or linear order (Embick, Arregi & Nevins).

The adjacency requirement in (20) is too strong. While the trigger for verb suppletion must indeed be the closest DP to the verb, it does not have to be *strictly* adjacent to the verb. An adverb and PP can intervene (21a), as can a particle (21b).

(21) a. N**ɨ**mmi kwaya **n**ɨ**mmi** t**ɨ**bongo o-tu **mi'a**.
1PL.EXCL far.away **1PL.EXCL** downhill there-LOC **go.PL.IPFV**
'We, a long ways downhill we went.' (Thornes 2003:535)

[4]There is a variation on (17) that Embick considers (p. 53f.), in which a phase head only triggers spell-out of a lower phase if that phase contains another phase. This would derive all the patterns of suppletion above, except for the one in (18). The original direct object and applied object are contained within the same minimal phase as the verb, and hence both should be able to condition suppletion.

b. Usu **taka** tɨwao **koi-kwɨ**…
that.NOM **1DL.ACC** also **kill.PL-IRR**
'She will kill us, too…' (Thornes 2003:493)

For this reason, I propose that the adjacency condition is *relativized*, so that only elements from a certain class count for the purposes of calculating what is closest.

Without a doubt, there is more than one way to do this. As a first attempt, I relativize the adjacency condition to *syntactic category*.

(22) *Relativized Adjacency*
For any vocabulary entry of the form: *abc* ↔ X[F_1 : α] / Y[F_2 : β] ___, the exponent *abc* can be inserted at a node with syntactic category X and feature [F_1 : α], **if there is no closer element of syntactic category Y** than one with feature [F_2 : β].

With vocabulary entries interpreted in this way, the exponents of a transitive suppletive verb in Northern Paiute can be stated as in (23). The plural suppletive form is only inserted if the closest DP has a plural φ-feature; similarly for the singular suppletive form.

(23) a. *patsa* ↔ V / D[φ : sg] ___
b. *koi* ↔ V / D[φ : pl] ___

Relativizing adjacency does not preclude a vocabulary entry from requiring strict adjacency. If its contextual description does not mention syntactic category, then that vocabulary entry will be inserted just in case the closest element has the other features specified, regardless of its syntactic category.

Why relativization to syntactic category?[5] To account for certain patterns of allomorphy in the Basque auxiliary, Arregi & Nevins (2012) argue that syntactic category plays a privileged role in competition during vocabulary insertion. A terminal node is first matched with vocabulary entries by taking into account the syntactic categories in its feature specification and contextual description: only if there is more than one matching vocabulary entry are additional features of those entries considered. This derives certain positional neutralization effects, in which a vocabulary entry is chosen that is globally less specific because its syntactic category matches the terminal node.

With Arregi & Nevins's innovation, it is not entirely clear how syntactic category should be incorporated into the adjacency requirement that is implicit in vocabulary entries. One possibility, which preserves the traditional conceptualization in (20), would require the closest element to have the syntactic category specified in the contextual description. But it is not obvious to me that vocabulary insertion is ever conditioned simply by the presence of an immediately adjacent element with a certain syntactic category.

An alternative that seems equally natural incorporates the relativized notion of adjacency in (22). A vocabulary entry looks for the closest element with the syntactic category specified in its contextual description. If it is necessary to look at other features, it is the

[5] Another obvious candidate would be to relativize adjacency to φ-features, which plausibly only DPs possess. This yields the same results as relativizing to syntactic category, as far as I can tell, for verb suppletion in Northern Paiute. But then the connection to Arregi & Nevins's (2012) work is less clear.

features of this element that are examined. Under this view, syntactic category serves to restrict the context for the purposes of matching any other features in the contextual description of a vocabulary entry.

5. Future prospects

Verb suppletion in Northern Paiute suggests that the domain of contextual allomorphy cannot be limited to sisterhood. This removes an immediate explanation for certain cross-linguistic generalizations about suppletion in comparatives. In particular, Bobaljik (2012) shows that suppletion of adjectives is found only in synthetic comparatives. This generalization follows automatically if the comparative morpheme can only trigger allomorphy of the adjectival root when they are both contained within the same complex head. While it does not plausibly arise from the adjacency requirement, I am hopeful that a different restriction on the domain of contextual allomorphy might derive this generalization.

Northern Paiute was unfortunately not very helpful for discovering what the outer limit of this domain is. It does, however, suggest that the relevant adjacency constraint on vocabulary insertion must be relativized to syntactic category. This does not prevent a vocabulary entry from requiring strict adjacency, but it does allow for the trigger of contextual allomorphy to be located some distance way. While relativized adjacency is a somewhat weakened hypotheses, it nonetheless makes clear predictions about the kinds of long-distance patterns of contextual allomorphy that can exist.

(24) The trigger of contextual allomorphy must have a syntactic category that is not represented in the material intervening between it and the target of vocabulary insertion.

I suspect that relativized adjacency may prove useful in accounting for several otherwise mysterious cases of long-distance of contextual allomorphy, including an agreement suffix that conditions allomorphy of an agreement prefix across the verb in Itelmen (Bobaljik 2000), verb suppletion triggered by negation in Korean (Chung 2007), verb suppletion conditioned by passive morphology, even when other valence-changing morphology intervenes in Latin (Carstairs-McCarthy 1992:69–70), suppletion by pronouns for case across a number morpheme in Tamil (Moskal & Smith, to appear, p. 12), and adjective allomorphy conditioned by a comparative suffix across an intervening suffix in Basque (Bobaljik 2012:156–158).

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